Light and Lighting

XX.—No. 12 December, 1937 Price 9d

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Manchester Road, Bury, illuminated by 68 REVO C.9685 Silvered Mirror reflector fittings and "Philora" 150w. Sodium Lamps.

SEEING IS BELIEVING

that good street lighting is largely a matter of correct equipment

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One cannot readily imagine an accident due to poor visibility occurring on this roadway. Such a safeguard is easily achieved. In this particular case, REVO C.9685 Silvered Mirror fittings best suit the conditions of service, and in conjunction with "Philora" 150w. Sodium Lamps, provide even, glareless illumination over roadway and pavements. Notice, too, the absence of "black spots" between units.

The units are mounted 25 feet high on span wires between existing tram poles, and spaced at intervals of 114 feet along this 33-feet wide main road.

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Incorporating "The Illuminating Engineer."

Light and Lighting

Official Journal of the Illuminating Engineering Society.

32, Victoria St., London, S.W.1.

Edited by J. STEWART DOW

Telephone: Victoria 5215

Vol. XXX.—No. 12 **December, 1937** PRICE NINEPENCE Subscription 10/6 per annum, post free

Principal Contents:

The Lure of Light

THE International Exhibition in Paris has now closed its doors, after 31,000,000 visitors have passed through the barriers.

Although it had already been open for some months before the visit of members of the Illuminating Engineering Society in September last interest seemed unabated. On Saturdays and Sundays one had literally to fight one's way into the more popular pavilions. Fêtes and special displays drew crowds up to quite a late hour at night.

That visitors were keenly interested in the contents of the pavilions can scarcely be doubted. One was struck by the throngs, which included people of quite humble station, in some of the more technical sections.

When all is said and done, however, we cannot question that the display of lighting (see pp. 350-352), undertaken on the vastest scale ever attempted at an exhibition, was a dominant attracting force.

Here is a lesson for our own authorities. A great exhibition is to be held in Glasgow next year. Let us hope that the allocation for lighting will be on a generous scale and that the resources provided will be used with skill and imagination.

Lighting at the Paris Exhibition

Another of the new special sections of the Illuminating Engineering Society entered on its programme on November 9, when M. Dourgnon, who had come over from Paris specially for the purpose, gave an account of the lighting of the Paris Exhibition. We give elsewhere a summary of his address and of that by Mr. R. O. Sutherland, who followed. A feature of M. Dourgnon's contribution was the display of lantern slides, some showing actual colours of lighting effects, and the film illustrating the scenic display on the Seine, in which fountains illuminated in colour and fireworks played a leading part. The audience was worthy of the occasion—there were certainly quite as many people as usually attend at the Institution of Mechanical Engineers for ordinary meetings—and we hear that a very satisfactory response has already been received from outsiders invited to join the section. The second meeting of the series is allocated to a discussion on problems in decorative lighting to be initiated by various architects.

The Photometry of Projectors

The first meeting of the Photometry Section on November 23 presented an interesting contrast to the event mentioned above, the discussion being of a technical character throughout. It served admirably to illustrate the chief utility of this section—affording opportunities for detailed discussion on photometric problems, such as cannot be indulged in frequently at general meetings. Dr. Hampton's paper on "The Photometry of Projectors" raised a number of knotty points, which were amplified in the discussion. To some of those present it may have come as rather a shock to discover what an important part absorption by the atmosphere may play in such measurements and how variable the behaviour of the atmosphere may be. These considerations have an obvious bearing on the photometry of street lamps, and the prediction of illumination and brightness on the roadway, for the distance of the illuminated spot from the source is often considerable. Weather conditions of a character liable, one would imagine, to influence results materially are quite usual in winter. Consideration of such conditions shows how injudicious it is to attempt to frame contracts in which the candle-power or illumination is specified with extreme precision, as is still sometimes done.

Wireless Supply for Lighting

For the first time, so far as we know, practical efforts have been made in Hamburg to feed lamps on a radio circuit with energy derived from a transmitter. This led to keen discussions in Court. The actual position, as revealed in the "Electrical Times," is that the inhabitants of a cottage quite close to Hamburg's 100-kW transmitter took the supply for lamps in their summer house by means of a specially constructed wiring arrangement tuned to the Hamburg wavelength. The whole operated on the principle of an absorption wave meter. The German postal authorities, who have radio transmission under their control, took the matter seriously, but were told by the Judge that prosecution would be successful only if the plaintiffs were able to prove that a marked weakening in power of transmission had been caused.

Recommended Values of Illumination

Reprints Now Available

Readers will recall the publication in the "Transactions" of the Illuminating Engineering Society for August last of a revised version of the Society's "Recommended Values of Illumination," in which certain new values relating to the lighting of schools and in the home were introduced. Reprints of the recommendations in a handy leaflet form are now available.

The Society's recommendations in regard to the Use of Portable Photometers (issued May, 1937) have been reprinted in a similar manner.

Copies of either booklet may be obtained on application to the Society at a cost of 6d. each.

I.E.S. Meetings

LONDON.

Dec. 7th. Visit (Industrial Lighting Section of the Illuminating Engineering Society) to the Printing Works of Messrs. Waterlow and Sons, Ltd.; **6.0 p.m.**

Dec. 10th. Discussion of **Problems in Decorative Lighting** to be presented by various Architects (Decorative Lighting Section of the Illuminating Engineering Society), *(R.I.B.A. Building, 66, Portland Place, London, W.1);* **6.30 p.m.**

Dec. 14th. Mr. DEAN CHANDLER on **Incandescence Gas Lighting** (General Meeting of the Illuminating Engineering Society), *(Institution of Mechanical Engineers, Storey's Gate, London, S.W.1);* **6.30 p.m.**

Jan. 11th. Mr. R. O. ACKERLEY on **Decorative Materials and their Response to Light** (General Meeting of the Illuminating Engineering Society), *(E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, London, W.C.2);* **6.30 p.m.**

Jan. 18th. Visit (Photometry Section of the Illuminating Engineering Society) to the Paint and Varnish Research Laboratory, Teddington, to be followed by an address dealing with the **Application of Photometry to Paint Research; 6.30 p.m.**

Jan. 28th. Mr. M. G. BENNETT on **Railway Lighting** (Joint Meeting with the Public Lighting Section and the Industrial Lighting Section of the Illuminating Engineering Society), *(E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, London, W.C.2);* **6.30 p.m.**

MANCHESTER.

Dec. 13th. Mr. J. SWARBRICK on **Measurement of Daylight in Buildings** (North-Western Area Local Centre of the Illuminating Engineering Society), *(Engineers' Club, Albert Square, Manchester);* **7.15 p.m.**

Jan. 24th. Mr. J. EDGAR on **Lighting for Sport Entertainment** (North-Western Area Local Centre of the Illuminating Engineering Society), *(Engineers' Club, Albert Square, Manchester);* **7.15. p.m.**

LEEDS.

Dec. 13th. Mr. R. GILLESPIE WILLIAMS on **Decorative and Colour Lighting** (North Midland Area Local Centre of the Illuminating Engineering Society), *(Leeds City Tramways Social Club, Concert Hall, Swinegate, Leeds);* **7.0 p.m.**

Jan. 17th. Visit (North Midland Area Local Centre of the Illuminating Engineering Society) to Montague Burton, Ltd., Hudson Road Mills, Leeds; **4 p.m.**

Jan. 17th. Mr. J. W. HOWELL on **Lighting in the Textile Industry** (North Midland Area Local Centre of the Illuminating Engineering Society), *(Electricity Showrooms, The Headrow, Leeds);* **7 p.m.**

GLASGOW.

Dec. 8th. Mr. T. M. LAPPIN on **Electrc Lamps, Their Specification and Testing** (Scottish Local Centre of the Illuminating Engineering Society) *("The Gordon," 19 Gordon Street, Glasgow, C. 1);* **7.30 p.m.**

Jan. 19th. Open discussion on **Industrial Lighting and the Accident Hazard,** (Scottish Local Centre of the Illuminating Engineering Society) *("The Gordon," 19 Gordon Street, Glasgow, C 1);* **7.30 p.m.**

DUBLIN.

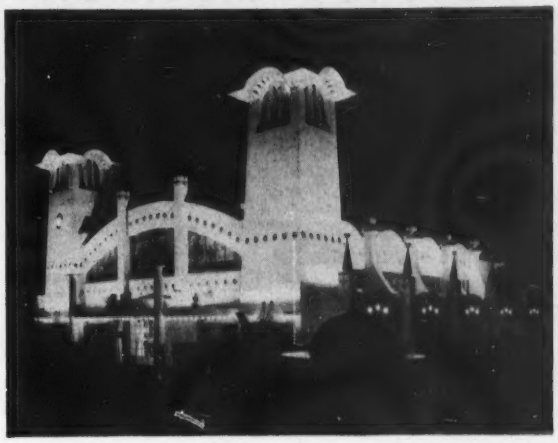
Dec. 7th. Dr. S. ENGLISH on **Glassware in Relation to Illuminating Engineering** (I.F.S. Local Centre of the Illuminating Engineering Society) *(Engineers' Hall, 35 Dawson Street, Dublin);* **8 p.m.**

Jan. 6th. Professor G. B. VAN DER WERFHORST on **The Sodium Electric Discharge Lamp** (I.F.S. Local Centre of the Illuminating Engineering Society), *(Engineers' Hall, 35 Dawson Street, Dublin);* **8 p.m.**

E.L.M.A. Lighting Service Bureau of Scotland

The recent design course of the E.L.M.A. Lighting Service Bureau of Scotland, for which Mr. M. W. Hime is the district engineer, seems to have been phenomenally successful. The attendance for the six lectures reached 1,492, which is believed to be a record. It is interesting to observe that electrical contractors formed about 50 per cent. of the audience. The lectures, which opened on October 12, dealt with Modern Methods of Illumination Planning (Mr. M. W. Hime), Lighting for Seeing (Mr. A. D. S. Atkinson), Electric Light Sources and Their Characteristics (Mr. W. J. Jones), Floodlighting Practice in Commerce and Industry (Mr. H. Lingard), Modern Industrial Lighting (Mr. R. O. Ackerley), and Modern Shoplighting (Mr. M. W. Hime) . For each meeting a chairman well known in the electrical industry in Scotland was selected and special speakers were appointed to open the discussions.

Floodlighting a Marine Pavilion



The above picture shows the appearance of the Wellington Pier Pavilion, Great Yarmouth, which has been floodlighted with ten 150-watt Philora sodium units by the Great Yarmouth Corporation Electricity Dept. The building is coated with uralite and is painted white, thus forming a very good subject for treatment and is seen to great advantage by the golden light of the sodium lamps.

Applications of Fluorescent Material

This fascinating topic has been recently discussed in "Lux" by M. Deribere, who recalls that even ordinary paper exhibits appreciable, though certainly feeble, fluorescence. Papers treated with appropriate materials are, however, capable of giving vivid effects when exposed to ultraviolet radiation. Eosin and rhodamine are familiar examples of such substances. Of special interest is the possibility of prolonging phosphorescent effects and thus securing a steady brightness which will persist after the stimulus has been withdrawn. In this connection the possibility of producing self-luminous maps either for ordinary use or for military purposes—which can be read in the dark without any extraneous source—is by no means remote. The problem of providing a wallpaper which will be stimulated by the sun's rays during the day and will continue to give out light during the night is one for future solution. But in the meantime the use of wall-papers which exhibit decorative fluorescence while subject to radiation is by no means remote—especially in view of the probable extending use of discharge lamps for indoor lighting. Fluorescence may also prove useful in connection with quite a variety of problems the solution of which demands that the illuminated object should be bright but the source inconspicuous. It is said, for example, that it is already almost practicable to read the pages of a book impregnated with fluorescent substances, by the non-visible radiation from an excited argon tube—which would seem to suggest a satisfactory solution of the problem of reading in bed.

The Appraisement of Lighting

Methods of Appraisement—Specifying the Source—Appeal to the Photometer — The Human Eye — Photoelectric Cells — Judgment of "Ability to See" — The Importance of Contrast — Coloured Light and Colour-Rendering.

On October 22, at the Royal College of Science, Dr. C. C. Paterson delivered the Physical Society's twenty-second Guthrie Lecture to a crowded audience. His discourse, which was very fully illustrated with slides and a series of striking demonstrations, dealt with the subject of lighting from a rather novel angle. He began with an entertaining account of the petition presented in 1680 by the Tallow Chandlers' Company to the Court of Common Council of the City of London. In this the petitioners protested against the introduction of lamps, or other "lucidaries," in place of candles for the purpose of lighting the streets of the city. They urged the stricter observance of the Common Council's rule which required every householder to hang outside his door during the winter "a substantial Lanthorn and a candle of eight to the pound." As Dr. Paterson said, this method of appraising lighting by simply specifying the source of the light is probably still the most widely used in common practice.

Measurement of Candle Power.

In dealing with the appraisement of light by accurate measurement, Dr. Paterson pointed out that for many years photometry was mainly confined to the measurement of luminous intensity. In the early years of this century satisfactory standards were established for measuring this quantity, but this had scarcely been done before the operating temperatures of incandescent lamps began to climb. Some method of overcoming the difficulties of heterochromatic photometry thus introduced had to be evolved, and, as an essential part of this work, the relative luminosity curve for the average eye had to be determined by laborious investigation. This curve, used in combination with spectrophotometric measurements, in which no colour difference was involved, made it possible to compare lights of any colours, especially if they were of the continuous-spectrum type. For other sources, such as discharge lamps which gave a line spectrum, it was usual to employ colour filters which gave a sensation colour match in the photometer head.

Photometry of "Coloured Light."

At this point an image representing a Lummer-Brodhun photometer field was thrown on the screen. One part of the field was illuminated with light from a h.p. mercury vapour lamp and the other part with light from a tungsten lamp, first unfiltered and then transmitted through a colour filter giving an approximate match with the mercury light. The relative ease with which balance could be obtained in the latter case was evident. The principle of the flicker photometer was then demonstrated, the mercury and tungsten (unfiltered) light being thrown on the screen alternately at a gradually increasing speed. It was shown how, at a suitable speed of alternation, the point of photometric balance could be readily determined by the disappearance of the flicker, a slight increase of either light being sufficient to cause the flicker to re-appear.

Photoelectric Cells.

Dr. Paterson then described the use of photocells in place of the human eye for appraising light by quantitative measurement. He referred to the various precautions necessary in photoelectric photometry and mentioned the methods by which the cell was caused to give results in agreement with those obtained visually. An outstanding advantage of the photocell was its sensitivity and this was demonstrated by exposing a cell to a lamp behind which was a black velvet screen. When this screen was removed, leaving in its place a matt-black painted surface, the galvanometer connected to the cell showed a deflection of about three feet on the scale, although the light falling on the photocell had changed by only about 0.5 per cent. Another application of the photocell—this time one of the rectifier type—was to the rapid determination of polar curves of candle-power distribution from lighting fittings. The "plotter" demonstrated by Mr. G. H. Wilson at the opening meeting of the Illuminating Engineering Society in 1933* was shown. In concluding this section of his lecture Dr. Paterson mentioned the newly adopted primary standard of luminous intensity. He pointed out, however, that all this elaborate technique for measuring intensity did not help much in the appraisement of lighting for the purposes of vision.

"Ability to See."

The third section of the lecture was devoted to a consideration of the appraisement of light by ability to see. The lecturer first pointed out the necessity for taking into account the phenomena of glare, and he then went on to emphasise the importance of brightness and contrasts as the controlling factors in seeing. To illustrate his point he visualised a world in which there were no artificial light sources: all improvement in seeing would then have to be achieved by the artificial enhancement of contrasts. The use of illumination as a gauge for lighting was only of value when it was directly related to the really important quantity, viz., brightness. Actually, every visual photometer was a brightness photometer, but for practical purposes it had been found desirable to design instruments specially adapted to measure the brightness of surfaces subtending very small angles at the observer's eye. (Examples were exhibited.) A fairly recent development was the use of photography for measuring and recording brightness and brightness contrasts. A photograph made and viewed under carefully controlled conditions could give a very truthful reproduction of the original scene, and an example of this, a picture of a street at night, was thrown on the screen and compared with another picture of the same scene in which the photographer had used all his art to cause the street lighting to appear to the best possible advantage.

Appraisement of Contrast.

On the subject of contrasts and their appraisement, the lecturer pointed out that until recently all that had been done was to measure the smallest difference of brightness perceptible to the eye. What was generally needed, however, was a method of appraising contrasts well above this threshold, and modern developments in television gave promise of progress in this direction, since in the television image both contrast and brightness range could be varied at will. The effect of changing contrasts in a photograph was shown by superposing two similar pictures, one very "contrasty" and the other very "flat," and altering the relative proportions on the screen.†

Colour and Colour-Rendering.

The appraisement of coloured light was the subject next dealt with by Dr. Paterson, who said that

* See "Light and Lighting," Vol. 26, p. 283, 1933.

† See L. C. Jesty and G. T. Winch, Illum. Eng. Soc. (Lond.), Trans., Vol. 2, p. 112, 1937.

this problem had been brought into greater prominence by the advent of the new discharge lamps. The distinction between the colour of the light and its colour-rendering properties was of great importance. Colour could be specified conveniently on the I.C.I. trichromatic system, and the photoelectric colorimeter devised by Mr. G. T. Winch and Miss E. H. Palmer was demonstrated.* The colour-rendering properties of a light, however, depended on its spectral distribution, so that two lights might have the same colour, but coloured objects might appear differently when illuminated by them. This was demonstrated by showing coloured materials under (a) light from a mercury lamp, and (b) light from a tungsten lamp passed through a filter to bring it to the same colour as (a). Several possible ways of specifying "colour-rendering" had been proposed. The lecturer suggested that one method would be to measure the colour of the light reflected from, or transmitted through, a selected series of coloured materials or filters. He then went on to mention industrial processes for which the line-spectra sources had been found specially advantageous on account of their colour. During this section of the lecture an amusing demonstration was given showing how objects, clearly visible by colour contrast with their background when the lighting was from a continuous-spectrum source, might completely disappear under lighting of a certain colour.

At the conclusion of the lecture Dr. Paterson demonstrated some of the extra-high-pressure mercury lamps, including, finally, one which had a brightness approaching 150,000 candles per sq. cm. (about 90 per cent. that of the sun), but, unfortunately, a correspondingly brief life. His final words were an apt summary of the whole trend of his remarks. "The illuminating engineer of yesterday," he said, "was the candle-power engineer of the day before. He is becoming the brightness engineer of to-day, but as soon as physics has provided suitable and understandable techniques for appraising contrasts he is surely fated to-morrow to become a contrast engineer."

*See Illum. Eng. Soc. (Lond.), Trans., Vol. 2, p. 137, 1937.

Better Street Lighting

Important Offer by the Ministry of Transport

As we go to press we learn that a circular is to be issued shortly to local authorities conveying an offer by the Ministry of Transport to pay half the cost of providing and maintaining lighting along main traffic routes, in accordance with the recommendations in the Final Report of the M.O.T. Committee.

It has been inferred that the expenditure on these lines may be of the order of £500,000 a year—though the exact amount involved is naturally a matter of conjecture at the present moment.

Physical Society's Exhibition

This twenty-eighth annual exhibition of scientific instruments and apparatus will take place at the Imperial College of Science and Technology (Imperial Institute-road, South Kensington) during January 4 to 6, 1938, when there will be a Trade Section and displays in the Research and Educational Section as usual. Tickets of admission may be obtained from the Hon. Secretary of the Illuminating Engineering Society or from the Exhibition Secretary (1, Lowther-gardens, Exhibition-road, London, S.W.7).

A Street Lighting Conference

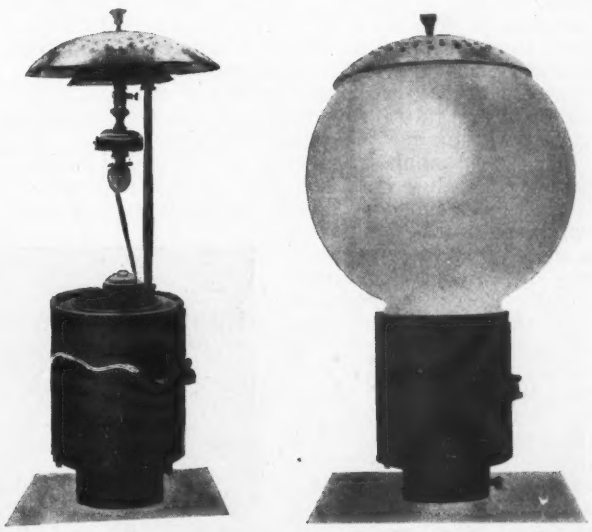
A successful E.D.A.-E.L.M.A. Street Lighting Conference was held in London at 2, Savoy Hill, W.C.2, on Monday, November 29, 1937.

The Conference was attended by many members of Councils who are Lighting Authorities, Lighting Committees, Watch Committees, and by Public Lighting Superintendents and Borough and Council Officials—about 150 in all, representing over sixty Lighting Authorities in the London and South-Eastern Area. Two-thirds of those present were elected members of Lighting Authorities, included among whom were the Mayor of Hastings and the chairmen of several Borough and Urban Authorities.

Under the chairmanship of Alderman Dudley Stuart, Mr. J. N. Aldington, in a lecture entitled "The New Era in Electric Street Lighting," gave a striking demonstration of the development of electric lamps from carbon filament days up to the present day of electric discharge lamps. Mr. J. M. Waldram, lecturing on "Modern Street Lighting," described and illustrated principles of visibility and the varied problems which have to be faced in planning the lighting of modern roads—a special feature being made of the recommendations made by the M.O.T. Street Lighting Committee in their final report. Mr. W. C. Parker, Borough Electrical Engineer, Fulham, led a discussion which followed on "The Economic Aspects of Street Lighting." After tea a party made a tour of some of London's electrically lighted streets, and inspected typical installations of filament, mercury discharge, and sodium lighting.

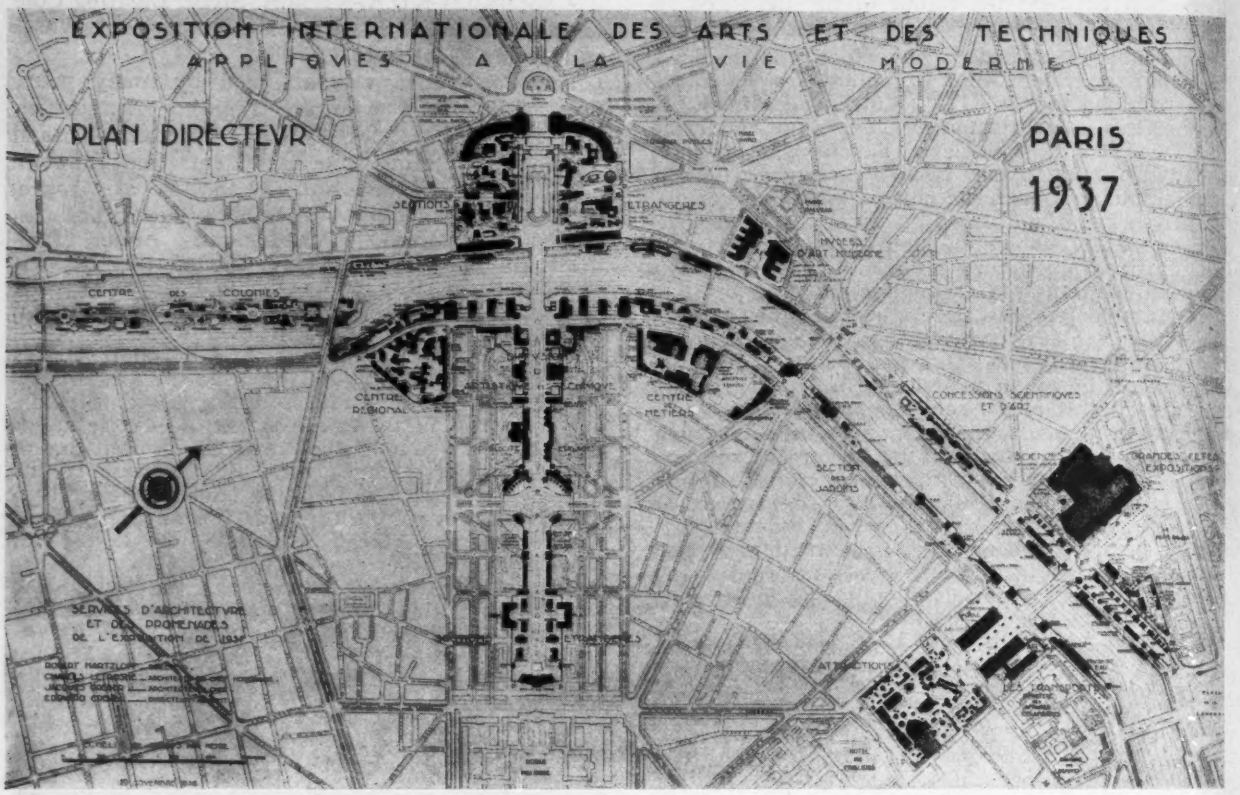
Gas-Lighted Belisha Beacons

We illustrate below the gas-lighted Belisha beacons which have been the subject of experiments by the Newcastle-upon-Tyne and Gateshead Gas Company. The fittings comprise two cast iron galleries; three steel pillars, which form the frame of the clock box; a sheet metal cover for the box; an amber globe, and



a yellow enamelled flue cap. A bijou gas mantle with aluminium corona is used in conjunction with a clock controller and governor set to 25/10ths pressure. Two such beacons are operating satisfactorily and orders for a quantity are anticipated. Further experience in Newcastle will be watched with interest.

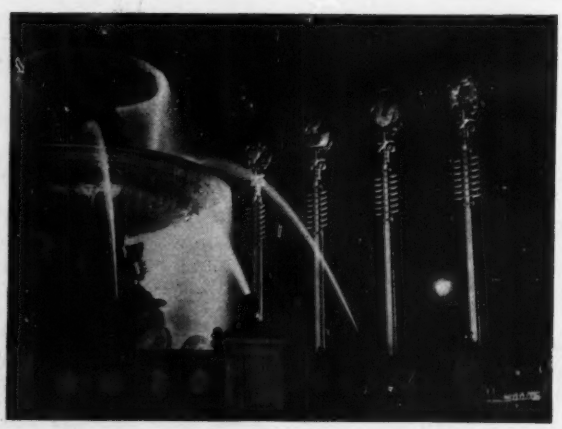
Notes on the Lighting of the International Exhibition in Paris



A plan showing the vast extent of the Exhibition and the arrangement of its main sections on the banks of the Seine.

The party of members of the Illuminating Engineering Society, about twenty in number, who visited Paris in September last were fortunate in being able to see much of interest in connection with the lighting of the International Exhibition, largely owing to the kindness of M. Maisonneuve and M. Chappat, of the Compagnie des Lampes, and of others in Paris concerned with this vast scheme. When it is recalled that the exhibition stretches along both banks of the Seine for a distance of 3½ kilometres, and that its greatest width (from the Place du Trocadero to the Champ de Mars) is about 2 kilometres, it will be realised that it was only possible to see a mere fraction of the display in the few days available, and that it is now only possible in this note to give a very brief summary of what was seen.

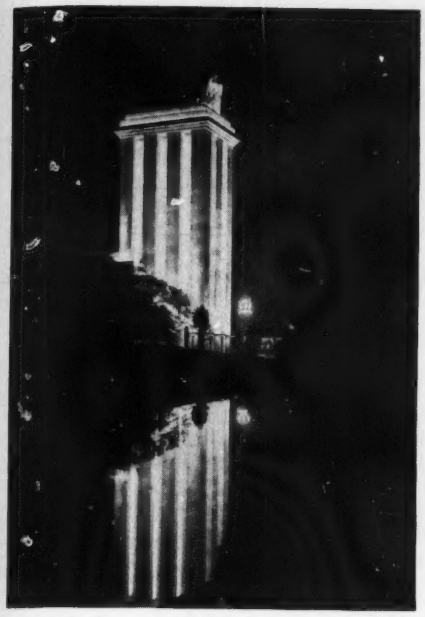
From the standpoint of visitors the central position occupied by the exhibition was a great convenience. It could be reached by the Metro (Underground Railway) at a number of points, and its tentacles penetrated the city in various directions. Persons approaching the exhibition were often made aware of its vicinity by special decorative lighting (one recalls, for instance, a weird type of lighting standard with luminous posts surmounted by a clear glass globe filled with water through which bubbles of air passed continuously!), and special lighting was provided on certain Metro stations adjacent to the exhibition gates. At the Place de l'Alma station, for instance, the platform was illuminated by two electrical discharge tubes, running its complete length, one giving red light and operating at 37 watts per metre, the other green light and consuming 29 watts per metre. This very effective system, requiring in all 66 watts per metre, does not seem extravagant, bearing in mind the high illumination which, truth to tell, compares favourably with that available on some of the more distant Metro stations!



Illuminated standards, such as these at the Porte de la Concorde, were prominent landmarks throughout the Exhibition.

A dominating feature of the exhibition was the Eiffel Tower, for the decorative lighting of which something like 10 kilometres of luminous tube was used. The general design ingeniously provided for tall obelisks so situated as to indicate the location of the chief entrances. Those familiar with Paris will appreciate the considerable removal of existing buildings necessary—for example, by the Quay d'Orsay—and in other ways the expenditure must have been terrific. The decoration of many of the bridges, several of them encased in wood or metal, with concealed lighting along the complete length of the balustrades, was typical in this respect.

One great advantage was the rising ground towards the Place du Trocadero, of which full advantage was taken. The descent from this point was by way of terraces embellished with illuminated fountains, and there was a clear vista looking across the river and down the main avenue to the Eiffel Tower, with the lofty German and U.S.S.R pavilions facing one another on either side and



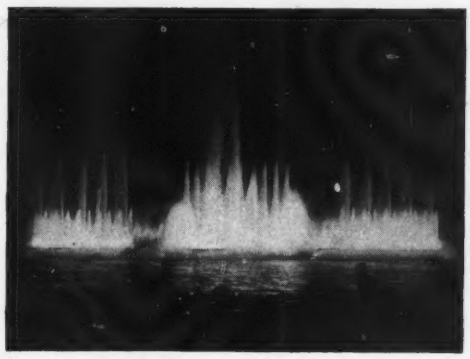
The German Pavilion, floodlighted. Tubular lamps, running the complete length of the vertical recesses aided the general effect.

The U.S.S.R. Pavilion, immediately opposite to the German Pavilion at the Pont de Jena, with gigantic figures also floodlighted.

forming a sort of subsidiary portal.

The floodlighting viewed from this point in the dusk, with the illuminated fountains in view, was very effective. In some instances other methods aided conventional floodlighting by projectors. Thus the even illumination of the lofty German Pavilion, and the display of the golden filigree pattern in the rectangular recesses which run from top to bottom was something of a mystery—until one detected the length of luminous tubing packed away in the corners. The full explanation of the lighting of the immense and apparently inaccessible figures surmounting the U.S.S.R. building remained, to the writer, something not fully explained. The interior lighting of many of the pavilions (when, in spite of the crowds, one was able to penetrate them) was effective throughout and in some cases ingenious.

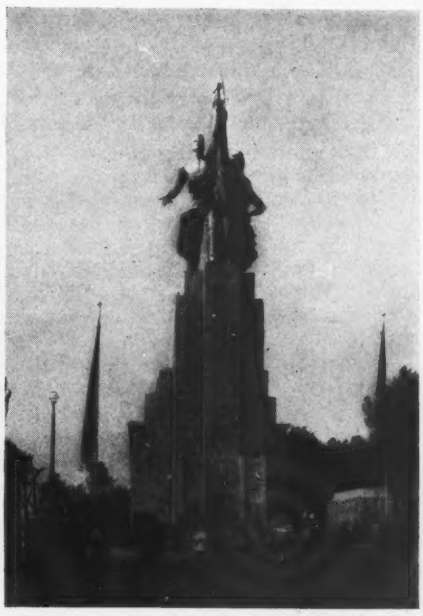
The exhibition being on the banks of the Seine, there was no lack of water, of which full advantage was taken in the decorative scheme. The masses of fountains illustrated on the opposite page, for which about 10,000 k.w. was allotted and which utilised more than 45 times the volume of water used in the great fountains at Versailles, played a leading part in the various "fêtes" organised from time to time, being assisted by ingenious fireworks and other devices on the surface of the river. The continually changing shape and height of the fountains, illuminated in continuously varying hues, made a most effective spectacle. One was struck by the completeness with which the water was illuminated, apparently largely due to the manner in which it was broken up into fine spray, so as to reflect the light. In the case of certain other fountains, for instance, those playing in front of the Trocadero, the water used had a purplish hue. It was understood that fluorescent material was included, though the writer did not witness any striking evidence of the use of this effect.



The illuminated fountains, the form and colour of which, constantly changing, played a leading part in the spectacular effects.

The party also spent an evening in the Palais de la Lumière, where they were given an explanation of the immense symbolical painting running from end to end of the great gallery in which the march of electrical progress and the portraits of the great figures in its history appear. Other demonstrations were reminiscent of those given by the Lighting Service Bureau in this country, but there were several special items, notably the searchlight, said to be the most powerful in existence, and to be visible in clear weather from Havre, 250 miles away. This utilises four 450 arcs, and is stated to emit a beam of 500 million c.p. Other displays included an impressive spark discharge between electrodes at 5,000,000 volts.

A front view of the German Pavilion by daylight.



A front view of the U.S.S.R. Pavilion by daylight.

Lighting Effects at the Paris Exhibition

Summarieses of Address delivered by M. Dourgnon and Mr. R. O. Sutherland at the Meeting of the I.E.S. Decorative Lighting Section on November 9, 1937.

There was an excellent attendance at the meeting of the Decorative Lighting Section of the Illuminating Engineering Society on Tuesday, November 9, when Mons. J. Dourgnon, who had come over from Paris specially for the purpose, gave his lecture on the lighting of the Paris Exhibition. The chief features of the lecture were a delightful series of lantern slides, many of them executed in colour, and the special film (which well repaid the trouble of getting it through the customs!) illustrating in colour a Fete at the Exhibition in which illuminated fountains on the banks of the Seine, fireworks, and other special luminous devices played a part.

M. Dourgnon, in his address, explained the reason for the choice of the site in the centre of Paris and gave impressive figures for the consumption of electricity throughout the exhibition. The following figures given in regard to consumption at successive exhibitions are of interest:—

	Area	Power
1925 Exposition des Arts Decoratifs, Paris	30 ha	7,000 kVA
1929 Exhibition at Barcelona ...	100 ha	20,000 kVA
1931 Exposition Coloniale, Paris	100 ha	21,000 kVA
1934 Exhibition in Chicago	———	36,000 kVA
1937 Exposits des Arts et Techniques	100 ha	63,000 kVA

This power (63,000 kVA) would suffice to meet the needs of quite an important town such as Toulouse and exceeds what is actually used in many others such as Bordeaux. It would, if entirely applied for this purpose, suffice to provide an average of 12 ft. candles over the entire exhibition area, though in fact much if it is devoted to other special effects. The lighting effects, in fact, include:—

(1) Temporary festive lighting, which is only provided on certain days, or in certain circumstances, and of which the theme may vary from time to time.

(2) Festive lighting of a more or less permanent character.

(3) The public lighting of the exhibition.

(4) The external lighting of the pavilions.

(5) Interior lighting of the pavilions.

M. Dourgnon pointed out the effect of the impressively tall buildings such as that even a jet of water 80 metres high appears small. He described in detail the process of combining musical and luminous effects in the various fêtes and the part played by the luminous fountain in the Water Theatre, over 80 ft. long. The Eiffel Tower again served as a luminous signal, being decorated with an immense length of luminous fluorescent tubing and floodlighted. It also served as a point for the display of fireworks. Other special items mentioned were those in the Pavilion of Light, to which reference has already been made on a previous page.

Mr. R. O. Sutherland, who followed M. Dourgnon, gave his impressions of the lighting, which, he remarked, necessarily involved a mixture of congratulations and criticism. It is essential to bear in mind the difficulties of a work on such a gigantic scale, and to regard the work as an *Exhibition* intended to interest visitors, not as an opportunity of illustrating every form of decorative lighting.

Dealing with the exterior design, Mr. Sutherland remarked that whilst recognising the ingenuity with which the Exhibition grounds were planned, he felt that it revealed little actually novel in connection with the general problem of exterior lighting. One broad principle was adopted, i.e., highways were kept dim so that the buildings could be more easily lighted and their brightness accentuated—an idea for which there is something to be said. In regard to the lighting of the approaches to the Exhibition gates, however, effective street lighting would have been preferable to decorative effects. In the Exhibition there was no "fairy light" strip illumination (in his opinion a good decision), and there were few animated signs. Mercury and sodium lamps were used with good effect for the lighting of foliage. A feature, particularly on bridges, was the indirect lighting from handrails, and the decorative illumination of some of the bridges was very effective. A new and interesting effort was the "Ballet," on the Seine, which M. Dourgnon had illustrated. He was impressed with the technique of this idea, though there were still problems to be overcome in this effort to combine music colour changes and fireworks. The strip lighting at the bows of the boats carrying visitors, which illuminated the wash produced by the propellors, was very effective. The colour-lighting of fountains was also an idea with great possibilities. Buildings were illuminated mainly by floodlighting, and in this field nothing very special was noted. Amber appeared to be one of the most successful tones. A clever device applied to the Austrian building was the use of a shadow thrown on the white wall by a spreading tree, when floodlighted. The Sèvres Pavilion, with its lighted tiles and moulded pictures, was an interesting instance of built-in lighting. Other unusual effects were obtained with a large canopied roof, painted white, and with interesting patterns in neon tubes. Many of the pavilions utilised immense glass fronts. In regard to interior effects the British Pavilion was an interesting instance of attractive architectural lighting design, lamps being mounted on a trough gracefully suspended from a high ceiling. In fittings there was a marked tendency towards the more decorative side. Throughout the Exhibition he was impressed by the methods of display adopted.

London University: Tower Floodlighted

The impressive new tower of the University of London was illuminated by G.E.C. floodlights in honour of the visit of Their Majesties The King and Queen on November 10, 1937. The tower, which is an excellent subject for floodlighting, was a prominent landmark.

I.E.S. Public Lighting Section

Inaugural Meeting held at the Research Laboratories of the General Electric Co., Ltd., Wembley, on October 29.

The inaugural meeting of the I.E.S. Public Lighting Section, held at the G.E.C. Research Laboratories (Wembley), on October 29, was, as might be expected, very well attended. Many members succumbed to the double attraction, Dr. Paterson's address and the opportunity of seeing over the extensions of the laboratories.

In his inaugural address to the section, which is to be reproduced in extenso in the Transactions of the Society, Dr. Paterson covered a wide ground. His

Road brightness readings being taken from a lantern slide projection of a street lighting installation.

summary of the aims and objects of the section was followed by an analysis of the attitude of Government Departments to technical matters—a matter of some concern to the lighting industry, especially in connection with street lighting. The fundamental principles of street lighting were explored and the final report of the M.O.T. Committee (of which Dr. Paterson was himself a member) discussed somewhat fully. For the moment we need not anticipate the publication of the full text of the address which members of the Society should study, except to emphasise one very important point touched upon therein—the danger that recommendations may be regarded as final and unalterable, whereas, in the case of such a rapidly developing subject as lighting revision of such rules usually becomes necessary after only a few years.

We append a few views of the laboratories which contain much of interest. One of the most impressive features is the space available, which makes possible photometry at quite long range, a very desirable condition in five testing projectors, etc. The two main laboratories are so designed that they can, when necessary, be converted into a single room

A daylight view of the Model Street for the demonstration of street lighting.

ninety feet long. There are also two subsidiary laboratories, a photographic dark room, a local workshop, a projection room, and various offices. A good feature is the recognition that photometry rooms should not *always* be in darkness. Motor-driven blinds admit daylight when desired. Many forms of experimental work were demonstrated. One of the most interesting rooms is that devoted to projectors. Here, by a simple expedient, a throw up to 110 ft. may be obtained. There was an entertaining demonstration of a winking aerodrome light designed to assist pilots to keep the right track. By using the full extent of the laboratories it was possible to arrange for the observer to "fly" in a model cockpit, equipped with rudder bar steering and navigating compass, for a distance of twenty miles and at a height of 3,000 ft. to a scale of 1 in 1,000. The long throw of the lantern proved most helpful in producing a most lifelike projection of slides of street lighting installations, the large picture enabling the audience to examine such installations in great detail.

After passing through the laboratories a visit was paid to the experimental roadway, which is 1,200 ft. long, and is divided into two sections, having respectively asphaltic and concrete road-surfaces. By the aids of the permanent circuits provided central, single side staggered or double side mounting arrangements may be compared and effects of exposed and "cut-off" lighting systems contrasted.

A general view of new illumination extensions to the G.E.C. Research Laboratories. The picture shows the exceptional distances available for long-range photometry of projectors, etc.

The Economics of Industrial Lighting

A summary of an address delivered by Mr. A. E. Iliffe at the meeting of the I.E.S. Industrial Lighting Section on October 19. Mr. R. O. Ackerley presided.

In a stimulating address to the Industrial Lighting Section of the Illuminating Engineering Society, on October 19, Mr. A. E. Iliffe pointed out the variety of factors involved in an inquiry into the economics of industrial lighting. He instanced such questions as the cost of gas or electricity for lighting, the relation between adequate illumination and its effect on load factor, the effect of better lighting on health, safety, and vision, the influence of such improved vision on effort, and the economic significance of the results of such efforts.

He remarked on the difficulty of assessing a standard of industrial life in terms of money. Assuming that a definite connection could be traced between comfort of vision and health, how can we measure health? Is it possible even to set an economic value on vision—could we ourselves mention any damages that would compensate us for the loss of sight? All human capacities vary considerably, and any economist must be a person of wide sympathies and practical sagacity in touch with men of different grades and capabilities, as well as familiar with the problem under investigation.

The deeper an investigation is carried the more formidable, he believed, would the advantages of efficient vision be found to be. Yet the operation of the eye means nothing until it is converted to muscular or nervous energy. Within limits greater ease and comfort of vision does lead to marked increase of muscular and nervous energy, though the amount will depend greatly upon the class of work to be executed, the need for vision, the intelligence of operators, etc.

One important criterion is the amount of spoilage. This, however, depends on the quality of the article, which again is connected with competition. What may be "just good enough" may also be a great brake on progress. He wondered how many manufacturers inspected their final product under the same intensity as that used when they are shown to the buyer? An instructive instance of the effect of better lighting on diminution in spoilage had occurred in a factory, where a diffused system of lighting, giving 24 foot-candles, had recently been installed. In these circumstances one serious form of spoilage had been detected, the loss involved in suits being returned owing to "ironing shine," a defect that could be easily remedied once it was recognised. Mr. Iliffe also pointed out the difficulty of setting an economic value upon the reduction of accidents, and on the gain in general health resulting from better lighting.

In order to illustrate how easily the cost of better lighting could be recovered he took a factory of 10,000 sq. ft. floor space. An average daylight illumination of 40 foot-candles, a cost of energy of ¾d. per unit, and an allowance of one employee per 100 sq. ft. was made. On this basis he estimated the cost per employee of various degrees of lighting as follows:—

True daylight	4d. per hour
Corrected lighting	0.4d. „
Diffused lighting	0.25d. „
Direct lighting	0.20d. „

Assuming an hourly average rate of 1s. 4d. per hour per employee, the cost of the energy alone would be met by a 25 per cent. better output, with maintained daylight intensity, 2.5 per cent. with "corrected" light, 1.5 per cent. with diffused light, and 1.2 per cent. with direct light. Actually researches had shown that the increased efficiency of the worker was usually above 10 per cent. when low values of illumination were raised to 10 foot-candles—improvements up to 30 per cent. being recorded for higher intensities.

In conclusion, Mr. Iliffe mentioned the case of a firm which had achieved net savings of £6,000 per annum through a change in lighting, involving the provision of 14 foot-candles in place of 6 foot-candles.

In the ensuing discussion many interesting points were raised. It was pointed out, for example, how the gain in efficiency arising from better lighting depended upon the proportion of time during which the eye was actively employed, and, which varied greatly in different processes. Instances were given of forms of accidents which had caused great indirect economic losses, against which no adequate insurance could be made. It was suggested that numerical results in terms of the gain in output arising from better lighting were necessarily difficult to establish, and that instances of defective work due to imperfect lighting conditions were easier to substantiate. Some account of unsuccessful efforts to interest insurance companies in the advantages of better lighting from a safety standpoint were given. Finally, it was suggested that the section should endeavour to obtain definite instances of cases in which accidents or spoiled work had been shown to be caused by imperfect lighting conditions.

The New Fluorescent Electric Discharge Lamps

These new lamps, which were shown at the opening meeting of the Illuminating Engineering Society in October last, have now been definitely put upon the market. (Announcements have so far been received from the British Thomson-Houston Company, Ltd., the General Electric Company, Ltd., Metropolitan-Vickers Electrical Company, Ltd., and Siemens Electrical Lamps and Supplies, Ltd.)

The new 400-watt lamps necessarily utilise bulbs which are somewhat larger than ordinary in order to eliminate possible prejudicial effect of heat on the coating of luminescent powder on their interiors. Two distinct shapes of bulbs, tubular and conical, are provided. Ultra-violet radiation in the discharge is converted by the fluorescent powder into visible light with the result that the proportion of red light is increased from 1 per cent. to 5-6 per cent., and the colour of the light is materially improved The life is given as 1,500 hours and the efficiency as 37-38 lumens per watt, as compared with 45 lumens per watt for the normal type. It is believed that the new lamps will prove useful for industrial use, for promenades, and in outdoor situations where people tend to assemble, and in other cases where improved colour is of importance.

Dublin's New "Great White Way"

A "Cut-Off" Installation using incandescent (filament) electric lamps in silvered prismatic reflectors.

In these words the new installation installed by the Electricity Supply Board on an "experimental mile" in the Merrion-road, Dublin, is described in some of the leading papers in the Irish Free State, which have devoted an exceptional amount of space to this topic. After the inauguration on November 2 there was a large gathering at the Hibernian Hotel, when the Lord Mayor congratulated the board on the success of the experiment. It is believed that similar methods will answer for similar important routes bringing traffic in and out of the city. We are indebted to Mr. F. X. Algar, public lighting engineer to the board, for the following particulars of the installation.

As will be noted from the adjacent effective picture of this lighted roadway a feature of the installation is the bold adoption of units with a cut-off of approximately 20°. The lanterns, of simple design, enclose a single-piece silvered dome reflector, with refracting prisms on the outer and silvered surface of the glass, but with a smooth inner surface. The lantern is open at the bottom and contains no glassware other than the reflector. An external thumbscrew permits focussing of the filament, adjustable both in a vertical and a horizontal plane.

The units, which utilise 300-watt filament lamps, are mounted in pairs, the lamps facing one another on opposite sides of the roadway, each pair being 120 ft. apart. The average height of suspension is 25 ft. 6 in. The thoroughfare averages 64 ft. in width, and comprises a roadway 38 ft. 6 in. wide, with a pathway 12 ft. 9 in. wide on each side. The centre of the roadway is paved with granite blocks, and the margins are surfaced with tar macadam. Brackets, with a projection of 6 ft. towards the centre of the roadway, are mounted on the tops of the tram-standards and serve to carry the lighting units.

The illumination on the road surface averages 1.0 foot-candles under the lighting units and 0.35 foot-candles at the test point, giving a diversity coefficient of 2.8 : 1 The diversity in brightness is greater than the diversity in illumination, and is visible to the eye. It is believed, however, that this variation in brightness does not seriously affect the visibility. Even brightness could be obtained by altering the focus of the lamps in the lanterns, but the introduction of more high-angle light in this way inevitably increases the brightness of the units and gives rise to complaints of glare. The consensus of public opinion is that adequate visibility is provided for all normal usage of the road as the installation now stands, and that such variations in road-surface brightness as occur are greatly preferable to the introduction of glare from the units. The installation ensures that any car-driver exercising ordinary care will observe an object of sensible proportions on the roadway up to a distance of a quarter of a mile ahead, and in all normal weather conditions other than fog.

A view of the new experimental lighting installation on a section of the Merrion-road, Dublin. There was a light mist and a damp road surface when the picture was taken.

Leicester's New Street Lighting

The above picture relates to a recent installation in the New Loughborough-road and Abbey-lane, Leicester, where Ediswan "Northbury" lanterns, mounted in pairs on steel poles, and equipped with 250-watt Escura electric discharge lamps, have been installed. The lanterns are spaced 125 ft. apart, are erected on the island in the centre of the road, and are mounted on brackets overhanging the carriageways. A clear distant view along the road is thus ensured, and, as the picture suggests, the roadway on either side of the central margin is brightly illuminated. The necessary chokes and condensers for the lamps are fitted in special compartments in the bases of the poles. The installation was carried out by the Leicester Corporation Lighting Department under the supervision of Mr. Thomas Wilkie, the city lighting engineer.

"Special" Industrial Lighting

In the paper on "Lighting for Special Industrial Processes," read by Mr. W. R. Stevens and Mr. S. Anderson, at the joint meeting of the Illuminating Engineering Society and the Association of Supervising Electrical Engineers, on November 16, a number of special problems were discussed. Two types of situation were considered: (a) Those requiring special mechanical features in the fittings design, and (b) those requiring special optical arrangements and light sources. It may be recalled that some of these topics were discussed in a series of articles in this journal by Mr. R. O. Ackerley some time ago*, but on this occasion they were discussed much more fully.

Situations where explosive or inflammable materials are used require special treatment, either by floodlights mounted outside and throwing light inwards through windows, or by using special flameproof fittings within the dangerous area. The authors demonstrated a robust form of fitting so designed that the flame caused by an explosion within it is cooled sufficiently rapidly to prevent it reaching the surrounding atmosphere. It was also mentioned that cold cathode electric discharge lamps may be broken in a methane-laden atmosphere without fear of ignition.

After dealing with protection against corrosion, the authors passed on to situations of the second class, such as those requiring artificial daylight for colour matching, special direction of light for the inspection of polished surfaces, etc. It was suggested that combinations of fluorescent discharge tubes may prove useful for colour matching, though for the most critical work the cold cathode carbon-dioxide discharge lamp is probably the best source.

One very special modern problem is the lighting of standards rooms such as are essential in the manufacture of modern aircraft engines. Here it is necessary to get the desired lighting conditions with a minimum of radiant heat. Various devices to facilitate the inspection of mirrors and polished metal sheets were also shown.

The paper, which was originally intended for a meeting of the industrial lighting section of the Illuminating Engineering Society, led to a keen discussion, especially in regard to the possibilities of flame-proof types of fittings.

* "Special Problems in Industrial Lighting." "Light and Lighting," October and November, 1936.

Obituary

E. M. SEVERN

We record with great regret the loss of Mr. E. M. Severn, who passed away suddenly on October 13.

Mr. Severn, Lighting Superintendent to the South Metropolitan Gas Company, was a past-president of the Association of Public Lighting Engineers, and was a familiar figure at its annual conferences. He was, however, almost equally well known to members of the Illuminating Engineering Society, with which he had been connected for many years. His kindly and genial disposition and his characteristic combination of practical sagacity with a sense of humour gained for him many friends in the lighting industry and won the esteem and affection of all with whom he came in contact.

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Spectacular Lighting Installations in Germany

The "Schaffendes Volk" (A Working Nation) Exhibition, Dusseldorf—Installations in the Royal Park, near Hanover—Illumination of Unter den Linden, the famous street in Berlin, on the occasion of Mussolini's State Visit to Germany this year.

Recent State festivities and Exhibitions in Germany have been made the occasion for spectacular lighting on an unprecedented scale.

At the Dusseldorf Exhibition the so-called "Light Organs," erected near the entrance were of highly novel design. Each consisted of a metal structure 26 m. high, covered with 550 architectural tubes each 1 m. long. The tubes give a white light which, by means of an automatic switch operating from top to bottom of the pylon, is continuously varied without

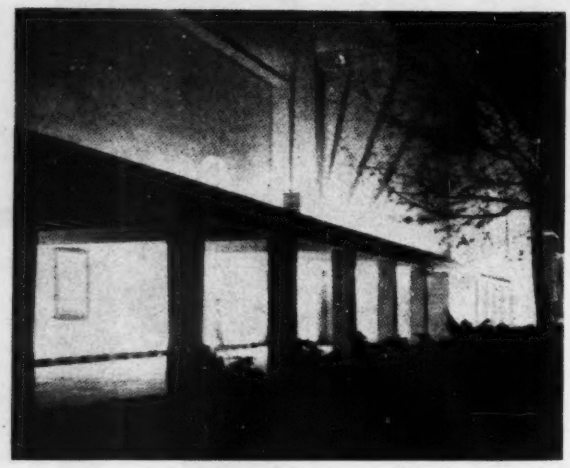


Fig. 2. The Persil Pavilion (Dusseldorf).

ever being totally extinguished. The resulting "crescendo and diminuendo" effect is responsible for the description "Light Organ." Each tower has a load of 110 kW.

Fig. 2 shows the exterior floodlighting of the "Persil" Pavilion, also at the Dusseldorf Exhibition. Here a multiplicity of tubular reflectors are mounted on the ground quite close to the walls, so that the

Fig. 3. Pylons at Unter den Linden (Berlin).

Fig. 1. The "Light Organ" (Dusseldorf).

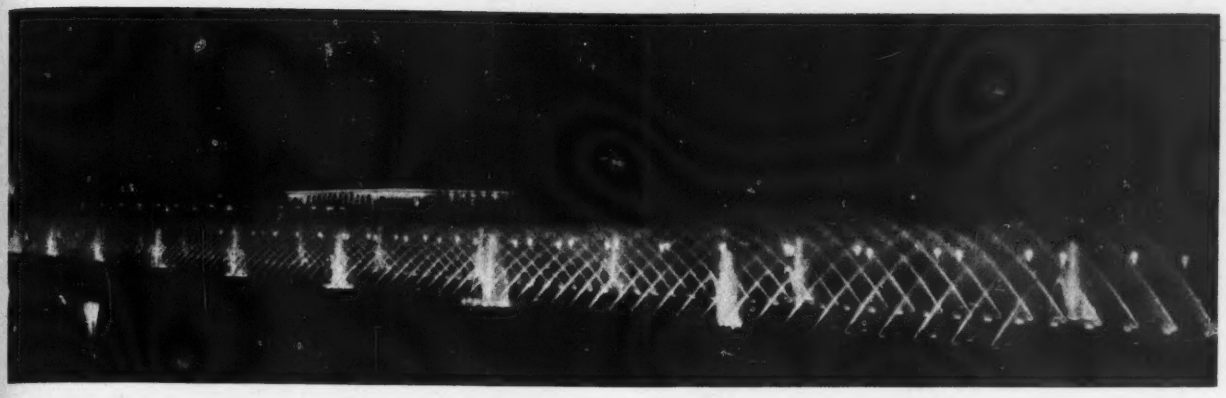


Fig. 4. An Illuminated Water Display.

beam from these is cast at a very small angle on to the surface of the building throwing the window frames and roof edge into high relief. In addition a pergola-like entrance, leading to the centre of the Pavilion, is equipped with a separate lighting arrangement which throws a fan-like shadow on to the flood-lit walls of the main building.

Fig. 4 illustrates impressive fountain illumination, also erected at the Dusseldorf Exhibition. An ornamental rectangular pond 200 m. long by 20 m. wide is equipped with 160 sprays, fixed on each of its two longest sides, which meet overhead in the form of an arch 12 m high. The fountains are illuminated by approximately 500 submerged reflector apparatus, each equipped with a 50 w. motor-car lamp.

Fig. 5. A Display of Gas Lanterns (Dusseldorf).

Fig. 5 shows a road illuminated by gas fittings built in the form of flashed opal glass lanterns at the same exhibition. This is stated to be the first time that gas lanterns of this special kind have been shown to the public in Germany.

Fig. 3 gives an impressive picture of the festival lighting arrangements in Unter den Linden on the occasion of Mussolini's State visit to Germany. Four lines of 140 pylons, each 12 m. high, were erected. Each is so constructed that the light source is concealed from view. Actually these six reflector-type bulb lamps, fixed in the centre of a parabolic reflector, are installed inside the edge of the base of each pylon. These units throw their light on to a plain glass mirror fixed inside the edge, so that light is sprayed evenly over the whole length of the pylon. The eagle at the top is lighted by other special sources. The installation involved a total load of 500 kW. This unusual method was adopted to meet the compulsory conditions that floodlighting apparatus should not disturb the architecture of the road nor give rise to shadow effects notably different from those under daylight conditions.

During the festivities floodlighting with ordinary white light was adopted, but some experiments with coloured light were afterwards made, the effect with golden-yellow light being considered particularly fine.

The Park at Herrenhausen, which surrounds the royal castle of the Hanoverian kings, has recently been restored, and the lighting arrangements were installed under the direction of several of the most eminent experts in Germany. In addition to the floodlighting of trees and foliage, a feature is the illumination of the fountains, amongst the most beautiful in the country, and resembling those at Versailles. One of these, the big "bowl fountain," formed by 168 sprays of water, is seen illuminated in Fig. 6, whilst Fig. 7 illustrates constructional details. A specially constructed squirting die allows a current of air to pass through at the same time as the water, consequently the water is segregated into drops and flakes. Each jet of water broadens towards the centre, thus effecting the shape of a bowl. A submerged reflector equipped with an eccentrically mounted 100 w. lamp is mounted adjacent to each jet. The angle of reflection can be adjusted and no glare can be created. On the other hand, the reflectors being submerged, it is essential that the water in the fountain should be maintained in clean condition. These reflectors light up two-thirds of the length of each spray. The remaining central portion is floodlit by a group of ten reflectors, fixed in the centre of the basin, each equipped with 1,000 w. 12 v. lamps. The whole arrangement is wired in 56 circuits of 36 v. and is fed by two 10 kva. transformers erected quite close to the fountain.

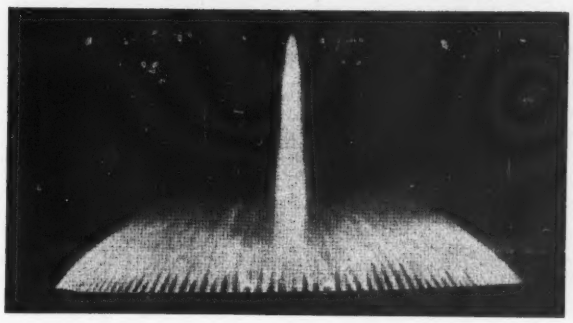


Fig. 6. Bowl Fountain (Herrenhausen).

Fig. 7. Details of Bowl Fountain (Herrenhausen).

These few examples may serve to show that the use of light for spectacular effect is exciting no little interest in Germany at the present time.

H. L. J.

Progress in Illumination

Some Notes on the Exhibits at the Opening Meeting of the Illuminating Engineering Society on October 12th, 1937.

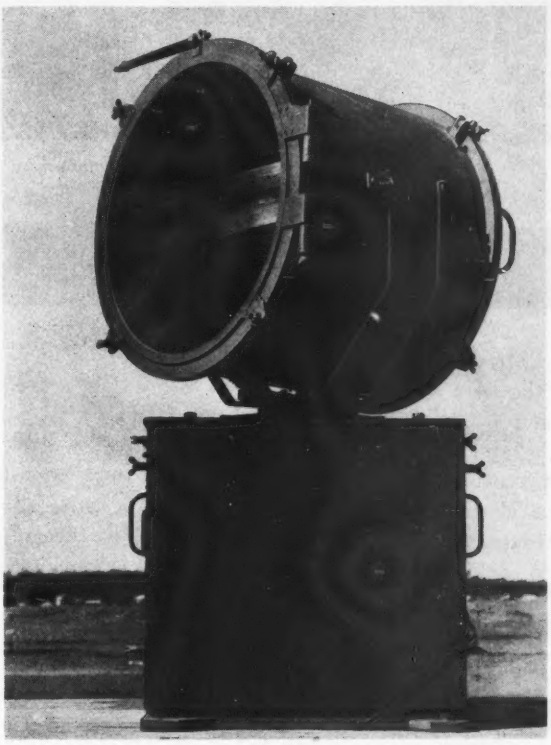
(Concluded from Page 334, November, 1937.)

Aerodrome Lighting.

Mr. K. V. Mackenzie (General Electric Company, Ltd.) showed a number of lantern slides illustrating aerodrome lighting equipment. The latest design of 6 kW. 6-lamp aerodrome landing floodlight was first illustrated. Line filament lamps are situated at the foci of parabolic trough reflectors in a housing 6ft. in diameter and 9 ft. high, giving ample room for a maintenance engineer inside the apparatus—a great advantage in bad weather conditions. (How severe weather conditions may be was illustrated by a picture of a site on the Karachi-Rangoon air route with men standing on the aerodrome with water up to their knees!) Another special unit provided for Singapore Airport can be used either to illuminate the aerodrome, or—on rotation through 180 deg.—for illuminating approaches for the seaplane channel.

Other slides illustrated illuminated floating buoys, such as those furnished for the seaplane channel at Singapore, the top of which accommodates a 6.6 v. 6.6 amp. boundary lamp. This gives upward light through amber glass and also illuminates the straight-sided cone on which it is mounted. Mr. Mackenzie also described the control desk supplied to the Liverpool Airport, so arranged that when the officer looks out of the window he sees the aerodrome before him in the same position as the plan on his desk.

A final illustration (here reproduced) referred to the new 24-in. diameter rotating beacon primarily designed for the new Australian air routes. The cylindrical lamp house body accommodates at the back a 24-in. silvered glass reflector of special contour. A tubular projector lamp is mounted at the focal point of the mirror, and there is also a standby lamp and a device to bring into action if necessary, without in the meantime obstructing light from the lamp in actual use.



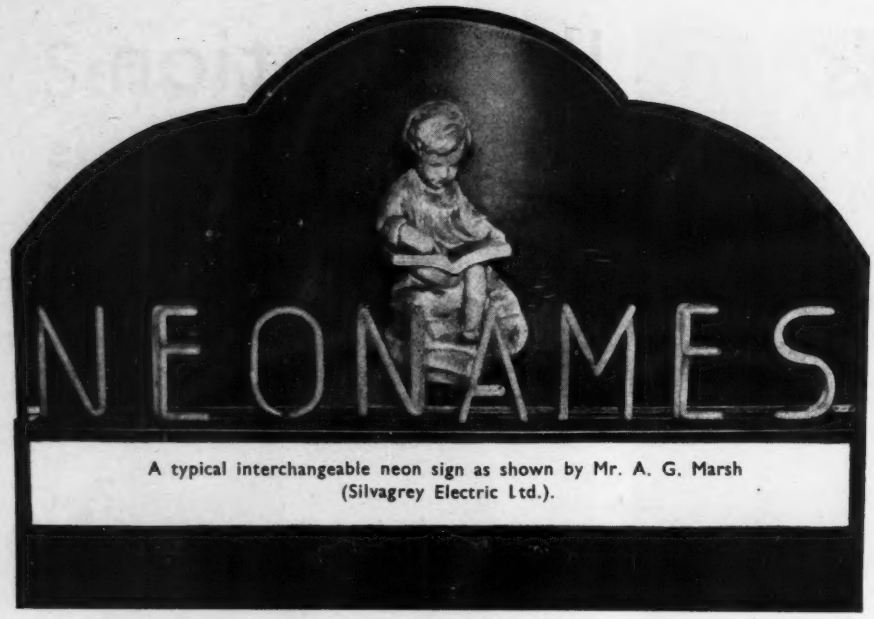
A 24" Rotating Beacon as used on the new Australian Air Routes.

A device for increasing downward illumination (Amplilux).

Dr. D. Starkie (The Amplilux Lighting and Illumination Company, Ltd.) demonstrated the device here illustrated. This consists of a ring of glass which, if merely slipped over an electric lamp, directs downwards light which would otherwise escape sideways, thus increasing substantially the illumination below the lamp. Dr. Starkie illustrated by diagrams the working of this prismatic glass ring, which is based on total internal reflection, and explained how the device can readily be fitted inside some form of diffusing fitting, thus accentuating the downward component of the light without the appearance of the unit suffering.

Other exhibits on the list included a display by the Horstmann Gear Company, Ltd., a feature of which was the new "Comet" device enabling automatic ignition of street lamps to be effected without the need for a continually burning bypass. Controllers fitted with a special attachment enabling them to be operated by hand in case of fog were also on view.

Another special item was a display by Mr. T. C. Angus, of the London School of Hygiene and Tropical Medicine, of a series of photographs, framed in glass, illustrating research.



A typical interchangeable neon sign as shown by Mr. A. G. Marsh (Silvagrey Electric Ltd.).

A new G.E.C. 2 kW. Studio Lighting Project or Projector.

Mr. A. G. Marsh (Silvagrey Electric, Ltd.) exhibited a specimen of the new interchangeable neon letter sign, a specimen of which is shown above. The sign illustrated makes provision for eight letters. It is equipped with a self-contained transformer switch and length of flex with plug attachment for connection to any existing a.c. lighting circuit. The change of the individual letters is quite easily effected. The neon letters simply drop into place, the two legs (invisible in the picture) fitting into sockets. All letters are 5 in. high. The overall length of an 8-letter sign is 36 in. and of a 5-letter sign 22½ in.

Mr. G. S. Barrett (General Electric Company, Ltd.) described a new form of film studio set illuminator, which represents an advance over the apparatus of this type exhibited in 1936. The type now shown may be used either as a spotting unit or as a flooding unit. It uses a mirror of special contour which, with suitable stippling, overcomes the drawbacks of earlier parabolic mirrors, and is designed for use with the new 2 kW. bi-post projector lamp. With this lamp in the focusing position the action of the mirror resembles that of the old parabolic type. For flood-lighting purposes, however, the position of the lamp is altered so that the cross-over beam is used to produce a flood effect. In this way a spread of 8 ft. diameter at a distance of 10 ft. can be obtained. The spot intensity is about 40 per cent. higher than that ordinarily obtainable.

The unit is of novel mechanical design, being roughly spherical in shape. It is built of aluminium casting and opens in two halves giving ready access to the interior, and a system of mirror ventilation is introduced to keep the rear of the mirror as cool as possible. Another feature is the shielding of the focusing handle in the cast body housing so that it cannot be damaged when the unit is moved. This handle, like the large control handle provided at the back of the unit for tracking purposes, is made of heat-insulating material.

The complete unit, with mirror and cradle, weighs only 40 lb. A similar unit to accommodate a 5 kW. bi-post lamp is in course of preparation.

Mr. H. C. Cooper (Mek-Elek Engineering, Ltd.) showed a small 12-volt lighting unit of unusually heavy construction. These units are for providing a small amount of light on the scales of instruments in conditions where lightly built fittings would be subject to damage, and they were designed in the first place for use on the apparatus used in making the statutory tests on gas meters.

The unit comprises a cast aluminium housing with lugs for screwing it to the apparatus and an extension with a protective glass which can be unscrewed for renewing the lamp. At the other end is a switch and a removable cover which serves both to grip the cab-tyre cable, which is brought in from below, and also to give access to the terminals for wiring up. The lamp used in 12 volts 2.4 watts miniature Edison screw.

Stevenson, Jordan, and Harrison, Ltd.

Change of Address

Messrs. Stevenson, Jordan, and Harrison, Ltd., Management Engineers, have recently moved their London Office to 324, Australia House, Strand, from 4b, Frederick's-place, Old Jewry. We understand that this change has been made necessary by the gradual and steady growth of the company's business.

Literature on Lighting

(Abstracts of Recent Articles on Illumination and Photometry in the Technical Press)

(Continued from Page 337, November, 1937)

II.—PHOTOMETRY.

323. New System of Photometric Units.

E. C. Crittenden. Elect. Engineering, 56, p. 1,323, October, 1937.

This short article gives the resolution adopted by the International Committee on Weights and Measures, and explains the changes to be made in the unit of intensity and the reasons for these changes. S. S. B.

324. Heterochromatic Photometry of Incandescent Lamps.

G. Ribaud and H. Djoudat. Rev. d' Opt., Vol. 16, No. 9, p. 297, September, 1937.

Describes in detail a method for the photometry of incandescent lamps, in which the lamp to be examined is compared at a low colour temperature with a primary carbon-filament standard, and a determination is made of the relative spectrophotometric characteristics of the lamp at this low, and at the normal, colour temperature. R. G. H.

III.—SOURCES OF LIGHT.

325. Silvered Bowl Lamps.

Anon. Magazine of Light VI., No. 8, pp. 19-20, October, 1937.

Instances with photographs are given of the use of silvered bowl lamps in hotel lighting. C. A. M.

IV.—LIGHTING EQUIPMENT.

326. Motor Factory Adopts Combination Lighting.

H. M. Hays. El. World, 108, p. 1,402, October 23, 1937.

Some details are given of a large installation in an electrical factory in U.S.A., where units combining mercury vapour and tungsten filament lamps were used. S. S. B.

327. Colour Lighting.

Anon. El. World, 108, p. 971, September 18, 1937.

A brief description is given of an arrangement for obtaining a three-colour change effect, by utilising a transformer with a rotating primary. S. S. B.

328. Design of Motor Car Headlights.

P. Cibie. R.G.E., 42, No. 15, pp. 451-456, October 9, 1937.

Deals with the ideal light distribution for headlights and projector design to obtain this distribution. W. R. S.

329. Photocell Control of Street Lighting.

Anon. Beama Journal, 41, No. 4, pp. 97-98, October, 1937.

A brief report is given of the successful service operation of photocell control of street lighting in Buffalo. 200 units are in service. The switching-on value adopted is 0.75 foot-candle. C. A. M

330. Multiple Street Lights on Polarised Relay Control.

T. F. Hildebrand. El. World, 108, p. 1527, November 6, 1937.

Details are given of the system used in an American town for controlling the street lighting by means of polarised relays. A single pilot wire is used in this circuit, energised by a d.c. impulse. The same pattern of relay is used for operating half-night or all-night lamps, but the latter have in addition a thermal relay, which prevents them being switched off with the half-night lamps. The system is capable of extension and may be automatised. S. S. B.

331. Slide Rule Yields Lamp Flicker Data.

C. P. Xenis and W. Perine. El. World, 108, p. 1375. October 23, 1937.

The authors summarise information on the perception of flicker in electric lamps, from medium frequencies down to low and non-cyclic variations. Two thresholds were considered, one of perception of flicker and another of objectionable flicker, and two curves were obtained relating voltage variation with frequency of variation for these two thresholds. In the cyclic flicker region lamp size is a dominant factor, but in the non-cyclic region rate of change of voltage is more important. From these data a type of slide rule has been designed, from which permissible voltage variation of any period can be determined. S. S. B.

V.—APPLICATIONS OF LIGHT.

332. Lighting in Factories and Workshops.

Home Office Welfare Pamphlet No. 7. (H.M. Stationery Office, 1937).

This is a revised version of the pamphlet with the above title, based on the three reports issued by the Departmental Committee on Lighting Factory in 1915, 1921, and 1922. The importance of lighting is emphasised, and the fundamental requirements are explained. Subsequent chapters deal with natural and artificial lighting, methods of unsatisfactory lighting, and illumination required for actual work. The appendices contain a summary of the recommendations of the committee mentioned above, its remarks on the measurement of illumination, and some illustrations of good and bad methods of lighting. J. S. D.

333. Utility Lighting Equipment

Anon. El. Rev., Vol. CXXI., No. 3126, p. 523, October 15, 1937.

A review, illustrated with photographs, of some special lighting fittings for the home. R. G. H.

334. Better Light for System Dispatchers.

W. S. Mowry. El. World, 108, p. 1373. October 23, 1937.

Details are given of a lighting scheme specially designed for the lighting of an American power supply company's operating centre dispatching room. A particular problem was the adequate lighting of the curved dispatch board. S. S. B.

335. Current Trends in Store Lighting.

J. L. Stair. Magazine of Light, VI., No. 8, pp. 4-9, October, 1937.

Numerous instances are given with photographs of unusual lighting schemes for various types of stores. C. A. M.

336. Lighting and Decoration for a Men's Sports Shop.

L. G. Gianini. Magazine of Light, VI., No. 8, pp. 22-23, October, 1937.

A description is given, with photographs, of the lighting equipment of two octagonal areas with a central luminous column. C. A. M.

337. New Motorola Installation.

Anon. Magazine of Light, VI., No. 8, pp. 28-30 . October, 1937.

The problem of lighting benches in a building with a high ceiling, but with interposed obstructing trusses was solved by the use of light-hoods. These consisted of lengths of troughing suspended over the benches and providing totally indirect illumination values of 40 foot-candles and using 150 w. lamps on 30-inch centres. Photographs are given. C. A. M.

338. Lighting in the Hospital.

H. W. Alexander, F. B. Lee, and L. S. Ickis. Magazine of Light, VI., No. 8, pp. 12-17, October, 1937.

A study is made of the requirements of hospital lighting, with particular reference to operating theatre fittings. Photographs are given. C. A. M.

339. Restaurant Lighting.

Anon. Elect., 119, p. 527, October 29, 1937.

Details are given of the lighting equipment of a new

restaurant at Edinburgh. Luminous panel and cornice lighting methods are used extensively. Photographs are given. C. A. M.

340. Theatre Lighting.
Anon. Magazine of Light, VI., No. 8, pp. 36-39. *October*, 1937.
Numerous types of lighting fittings and equipment for problems arising in theatre lighting are dealt with in detail. C. A. M.

341. Up-to-date Theatre Lighting.
Anon. El. Rev., Vol. CXXI., No. 3129, p. 668. November 12, 1937.
Describes, with photographs, the new lighting system of the Prince of Wales Theatre. Lights recessed in the edge of the circle have been substituted for footlights, which have been dispensed with. R. G. H.

342. New Electric Installations at the "Théâtre National de l'Opéra," in Paris.
M. Quesnel. R.G.E., 42, No. 15, pp. 461-476, October 9, 1937.
Includes a detailed account of the stage lighting with illustrations of the complete stage, and of individual lighting units. W. R. S.

343. Paris "Metro."
Anon. Elect., 119, pp. 539-540. November 5, 1937.
A brief description is given, with photographs, of the lighting equipment of typical stations on the Paris "Metro." In certain instances only discharge tubes are used. C. A. M.

344. Better Street Lighting.
Anon. El. Rev., Vol. CXXI., No. 3128, p. 627, November 5, 1937.
Summarises the Final Report of the Departmental Committee on Street Lighting appointed by the Ministry of Transport. R. G. H.

345. Planning of Street Lighting Installations.
Anon. Beama Journal, 41, No. 4, pp. 104-105, October, 1937.
The principles of modern methods of planning street lighting installations are discussed. Photographs are given. C. A. M.

346. Street Lighting in London.
Anon. El. Times, 92, pp. 479-480, October 7, 1937.
A brief account and photographs of new street lighting at Deptford and Hackney. W. R. S.

347. More Mercury Lighting in London.
Anon. El. Rev., Vol. CXXI., No. 3126, p. 527, October 15, 1937.
Deptford and Hackney Boroughs have both installed comprehensive schemes of mercury lighting, the former making extensive use of the new 80 watt and 125 watt types. R. G. H.

348. Golden Gate Bridge Lighting has Pre-assembled Standards.
Anon. El. World, 108, p. 1,189, October 9, 1937.
Some details are given of the lighting system for the San Francisco Golden Gate bridge, the main interest being in the preassembled standards used. Details of the general power supply system are also included. S. S. B.

349. The Lighting of Indian Aerodromes on the British Empire Air Routes.
G. S. Robinson. G.E.C. Journal, 8, No. 4, pp. 263-268, November, 1937.
Detailed descriptions are given of the lighting equipment of the various aerodromes on the route between Karachi and Rangoon. Photographs are given. C. A. M.

350. Singapore Airport.
Anon. El. Times, 92, pp. 497-498, October 14, 1937.
Describes the layout of the aerodrome and in some detail the lighting equipment installed. Photographs are given of the neon beacon, landing floodlight, wind, tee, and boundary light. W. R. S.

351. Sunderland's Illuminations.
Anon. El. Times, 92, p. 543, October 21, 1937.
Describes, with photographs, the illumination effects obtained in Roker Park. The theme of the lighting was fairyland. W. R. S.

REVIEWS OF BOOKS*

Commission Internationale de L'Eclairage; Record of Ninth Session in Berlin and Karlsruhe, July, 1935. (Cambridge University Press, 1937; pp. 680. 20s. net.)

It has often been urged that the excellent work done at sessions of the International Illumination Commission on Illumination ought to be more widely known. We gladly take the opportunity, therefore, of drawing the attention of readers to this comprehensive volume, occupying nearly 700 pages and summarising proceedings at the conference in Germany two years ago. The introductory matter comprises list of delegates attending, records of proceedings, and chief recommendations (amongst which those dealing with aviation lighting occupy considerable space). The greater part of the volume (about 500 pages) contains the reports from the secretariats on such topics as nomenclature, definitions and symbols, units and standards of light, glare, photometry and colorimetry, classification of fittings, street lighting, motor-car headlights, school lighting, architectural lighting, aviation lighting, traffic signals, coloured signal glasses, shadows, mine lighting, ultra-violet radiation, lighting education, and lighting practice. In general the reports on these topics are in the language (English, French, or German) of the country where the secretariat is located, but brief summaries in all three languages are given. In each case we have a review of progress, reports from different countries being gathered together. Although a somewhat lengthy period inevitably elapses before the fruits of each session can be assembled, the matter available is well worth study when it does appear.

* Books reviewed in these columns will be presented to the library of the Illuminating Engineering Society.

Coloured Light as an Art Medium. By Adrian B. Klein. (The Technical Press, Ltd., London, 1937; pp. 287. 30s. net.)

This is the third edition of "Colour Music." The title and the cover have been modified, and we notice references to several quite recent developments, such as the "light console," described by Mr. F. P. Bentham, a successor to the original "colour organ" of Wallace Rimington. The first portion of the book is devoted largely to a discussion of colour harmony and colour music, both as a supplement to other effects and as an independent art. Finally, there are special chapters on stage lighting and on instruments (past and present). Readers may be surprised to find that there is quite an extensive bibliography to this subject. There are references following each chapter and an extended list in the appendices, in which many quotations from the daily Press are included. Perhaps to readers of this journal the sections dealing with stage lighting will be of special interest. It has always seemed to us that the Klein colour projector has great possibilities in this direction.

Other Books Received

Photoelectric Cells: Their Properties, Use and Applications. By N. R. Campbell and Dorothy Ritchie. (Sir Isaac Pitman and Sons, Ltd., London, 1934; pp. 223. 12s. 6d.)

The Selenium Cell: Its Properties and Applications. By G. P. Barnard. (Constable and Co., Ltd., London, 1930; pp. 331. 35s.)

Studio Portrait Lighting. By Herbert Lambert. (Sir Isaac Pitman and Sons, Ltd., London, 1936; pp. 89. 15s.)

Television Optics. By L. M. Myers. (Sir Isaac Pitman and Sons, Ltd., London, 1936; pp. 338. 30s.)

Lighting by Gas. By Dean Chandler. (South Metropolitan Gas Company, London, 1936; pp 279.)

Recent Patents

(Abstracts of recent Patents on Illumination & Photometry.)

No. 470,809. "Improvements in or Relating to Electric Discharge Lamps."

The General Electric Company, Limited, Francis V. J., and Ryde, J. W. Dated February 27, 1936. *(Divided out of No.* 470,770.) *February* 22, 1937. *(Cognate Applications.)*

This specification deals with a subject matter similar to that of the specification last discussed. The high-pressure mercury vapour discharge device, adapted to operate only so that the discharge is inherently stable, comprises a body of refractory insulating material extending substantially the whole distance between the electrodes and with one part of its surface everywhere so near to the straight line joining the electrodes that, when the device is operated with that body uppermost, the discharge column cannot depart substantially from the straight line joining the electrodes under the action of convection forces.

No. 471,426. "Improvements in or Relating to Electric Discharge Lamps."

The General Electric Company, Limited, Francis, V. J., and Ryde, J. W. Dated March 3, 1936.

According to this specification in a high-pressure mercury vapour lamp a shielding member pierced with a hole is located between the electrodes and the surface of the envelope so that convection currents carrying suspended material from the electrodes may be prevented from reaching that part of the envelope which is traversed by light passing from the discharge through the hole, at least until they have deposited any suspended material.

No. 471,522. "Improvements in or Connected With Illuminated Signs or Devices for Advertising, Indicating, Display and Like Purposes."

McLennan, D. Dated February 15, 1936.

This specification covers a display device comprising a narrow trough, at least one wall of which is transparent or translucent, containing a liquid such as water, the whole constituting a body of plate form having two opposed optical faces. It is illuminated by light from the edges transmitted between the optical faces. The sign or the like to be displayed may be applied upon the inside or the outside of the wall of the container, for example by etching the outside of the wall, or it may be a body immersed in the liquid. The liquid may be coloured.

No. 471,865. "Improvements in and Relating to Portable Compressed Air Driven Turbo-Electric Mine Lamps."

Maurice, W., and The Wolf Safety Lamp (Hiring) Company, Limited. Dated March 10, 1936.

This specification covers compressed air-driven electric turbo alternator mine lamps in which compressed air is admitted through an orifice in the lower housing or body of the lamp to a series of equally spaced orifices adjacent and surrounding the electric lamp bulb within a protecting glass, whereafter the air is conveyed to a jet or nozzle to drive the turbine. In this way the air issuing from the orifices around and towards the bulb in a curtain cools the filament and prevents fire damp from reaching it if the protecting glass and globe are broken, even if the momentum of the generator should cause it to continue to generate current.

No. 471,900. "Electric Metallic-Vapour Arc Discharge Lamps."

Abadie, J.-B., J. M. Dated August 13, 1935. *(Convention, France.)*

According to this specification the envelope of a high pressure metallic-vapour discharge lamp is reinforced by a metallic grid structure embracing and in contact with it for cooling it. The grid structure is preferably formed of steel.

No. 472,064. "Improvements in and Relating to Photo-Cathodes for Photo-Cells."

The British Thomson-Houston Company, Limited. Dated May 3, 1935. *(Convention, Germany.)*

This specification covers a cathode for light-sensitive cells having a conducting sub-layer, preferably of silver, for connection with the cathode film, of sufficient thickness to provide the required electrical conductivity and in the form of a ring surrounding that portion of the cathode which is to receive the incident light. Adequate connection to the cathode film is thus secured without masking it against the light.

No. 472,232. "Improvements in or Relating to Anti-Dazzle Lights."

Wiemer, K., and Cotte, E. Dated March 15, 1935. *(Convention, Germany.)*

According to this specification polarizing means for minimizing dazzle from head-lamps is provided in the interior of the head-lamp casing between the light source and the reflector. Preferably the polarizer completely or almost completely surrounds the light source and may be located upon the lamp bulb by fusing, clipping, or cementing thereto. The polarizer may be dichroic foil consisting of microscopically small oriented crystals of herapathite embedded in a thin film.

No. 472,648. "Improvements in or Relating to Gas or Vapour Filled Electric Discharge Tubes."

Cleveland, F. J. (communicated by Oerensöfi, N. S.). Dated March 26, 1936.

This specification describes a hot cathode for a discharge tube having a conductive carrier portion and an emitting portion. The emitting portion is in the form of a coating covering a substantial part of the carrier, is non-conductive when cold and conductive only above its electron emitting temperature. The carrier is formed with apertures extending from the coated surface to the uncoated surface. Blackening of the tube is thus minimized by preventing current passing to the emitting portion until it is sufficiently hot to emit.

No. 472,649. "Improvements in or Relating to Gas or Vapour Filled Electric Discharge Tubes."

Cleveland, F. J. (communicated by Oerensöfi, N. S.). Dated March 26, 1936.

According to this specification an open ended cylindrical structure of refractory non-conducting material having walls of open-work formation surrounds the arc of a discharge tube so that a continuous circulation of the gas or vapour takes place there-around and the light transmission is not materially impeded. The structure may comprise parallel rods or tubes of zirconia, thoria, or erbia.

A New Mercury-Tungsten Combined Fitting

We illustrate below a novel type of fitting for which Mr. H. L. Juliusburger is responsible. In the centre is an 80-watt or 125-watt mercury vapour discharge lamp, which illuminates the ceiling, and also, with the aid of a surrounding conical reflector, the floor below. Around this central discharge lamp are grouped six 100-watt tungsten filament lamps. By introducing a reflecting surface in the bottom opening indirect lighting only is secured, and by adjusting the number of lamps the colour of the combined light may be modified without the general distribution of light being materially affected.

A Mercury-Tungsten Combined Fitting.

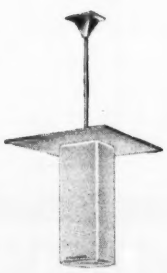
Contracts Closed

THE BRITISH THOMSON-HOUSTON CO., LTD.

Port of London Authority and *Mersey Railway Co.*—For the supply of Mazda lamps during the twelve months ending October, 1938.

SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD.

Government of Malta—For the supply of a large quantity of Siemens electric lamps for a period of twelve months.

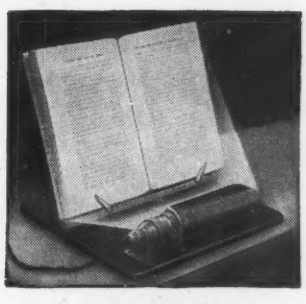


Hailware Novelties

We present here two out of a great variety of fittings featured in the new catalogue of Hailwood and Ackroyd, Ltd. Special interest attaches to the cylindrical "Gleamlite" patterns in 3-ply opal glass, to the corresponding series of units in rectangular form, and to decorative glass suitable for "architectural lighting" effects.

A Book Lamp

The little book lamp here illustrated, a handy device, may be regarded as an extreme instance of local lighting. It is one of many special units illustrated in the current lists of Mek-Elek Engineering Company, Limited. Jointed arm units for providing intense local lighting at machine benches, lathes, and drills, and for other forms of machine work are also shown.



A handy form of Bookholder with lamp attachment (Mek-Elek).

Public Lighting with Gas

A seven-year contract for gas lighting has been entered into by the Castleford U.D.C. About 633 lamps are covered by this agreement, and improvements in the lighting are to be carried out.

Improvements in the lighting of Knutsford, which is by gas, are to be put in hand as a result of a new agreement between the Council and the local gas undertaking.

The Duns Town Council has renewed its contract for the lighting of the burgh by gas.

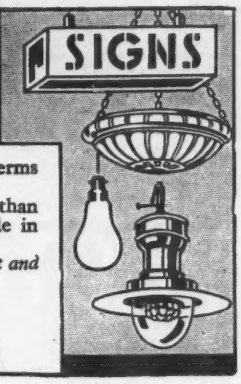
A five-year agreement for gas lighting has been signed by the Penybout (Glamorgan) R.D.C. in respect of the parish of Yuysawdre.

The Saltburn and Marske U.D.C. has entered into a ten-year contract for public lighting by gas in the streets under its control. About 330 lamps are at present in use, and improvements will be carried out as circumstances permit. Lighting improvements are also contemplated in the neighbouring borough of Redcar, which is lighted by some 670 gas lamps.

The New Factory Act in Northern Ireland

The text of Northern Ireland's Consolidating and Amending Factories Bill has now been issued. Part I. of the Act provides for securing in every factory sufficient and suitable lighting.

WHERE TO BUY
A DIRECTORY OF LIGHTING EQUIPMENT



We invite applications for spaces in this new section of the journal. Particulars of terms for each space (approx. 1 inch deep and 3½ inches wide) are given below.

These terms are equivalent to **half our ordinary advertising rates**, but not less than 12 successive monthly insertions can be accepted on this basis, and amounts are payable in advance.

Payment for an advertisement in this section entitles the advertiser to receive *Light and Lighting* during the period of the contract.

Terms:					
12 Successive Monthly Insertions	£3 10 0	Payable
24 " " "	£6 0 0	in
36 " " "	£8 10 0	Advance

1

MODERN LIGHTING FITTINGS
New Catalogue on application
Fittings manufactured to Architects' Specifications
ASCOG LIMITED
Ascog House, 44, Theobalds Road, LONDON, W.C.1

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PHOTOMETRIC EQUIPMENT for technical, lighting, and scientific research
ALEXANDER WRIGHT & CO., LTD.,
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ALLOM BROTHERS LTD.
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Specialists in the Science of Modern Lighting, including:
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Pictures and Picture Galleries. Floodlighting, etc.
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Take no risks— specify **BENJAMIN PLANNED LIGHTING**
THE BENJAMIN ELECTRIC, Ltd., TARIFF ROAD, N.17

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MAZDA LAMPS and BTH LIGHTING EQUIPMENT
Our Illuminating Engineers will be pleased to advise you on any street or floodlighting problem
THE BRITISH THOMSON-HOUSTON CO., LTD., Crown House, Aldwych, W.C.2

6

BROMFORD
Seamless Steel Lighting Standards
for all requirements
BROMFORD TUBE CO., LTD., ASTON, BIRMINGHAM

7

THE REINFORCED CONCRETE LAMP COLUMNS SPECIALISTS.
CONCRETE UTILITIES, Ltd.
WARE, Herts.

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TYPERLITE LOCAL LIGHTING UNITS ADAPTABLE TO ALL PURPOSES & SITUATIONS
Sole Proprietors and Patentees
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"ESLA"
BI-MULTI AND MULTIPLANE REFLECTORS
Lanterns, Brackets, Columns, Switches and Fuse Boxes, etc., FOR STREET LIGHTING
The Electric Street Lighting Apparatus Co.
The Foundry, Canterbury

14

VITREOUS ENAMELLING
(CAST IRON & M. S. SHEET)
Cooker parts, stripped & re-enamelled. Reflectors, Lanterns, etc., for Industrial & Public Lighting.
ELM WORKS Ltd., Summerstown, S.W.17. Est. 1903.

Index to "Where to Buy"

N.B.—The numbers are those attached to individual entries in the Directory (See pp. 371-373).

Lumophor Glass Tubes

We had recently an opportunity of seeing the effects of the above tubes which are composed of fluorescent glass and contain, as a filling, a mixture of neon argon and mercury vapour. The luminescence of the glass tube converts the short-wave radiation within the tube into visible light and a wide variety of colours may thus be secured. Messrs. Lustray Products, Ltd., of London, list over a dozen main colours, several of which, such as the "daylight" white and the "blue two-ply opal" have a very pleasing appearance. The tube appears uniformly bright all over and thus gives a "soft" light. Leaflets, issued by the Fischer Glassworks, give details of the performances of these tubes, including spectrum photographs and curves, showing the relation between brightness and current, temperature, transformer voltage, length of tube, etc. They also give—what is usually sought in vain for sources of this type—graphs illustrating the distribution of illumination under an installation of the tubes and directions for calculating the illumination in different circumstances.

Davenport Cinema, Stockport

This picture shows the under-gallery lighting of the Davenport Cinema, Stockport, by Holophane close ceiling units. The cinema is interesting for the very large area devoted to decorative colour lighting. Holophane white lighting units are also widely used, and "Auralite" fittings have been adopted in the café and entrance hall.

Catalogues and Advertising Literature

We invite all firms in the Lighting Industry to send us new catalogues as they appear, for reference in these column

BENJAMIN ELECTRIC, LTD.—New catalogue (No. 1500)—"Planned Lighting in Industry and Commerce." Illustrating many new Benjamin lines and containing a special feature dealing with a series of lighting problems.

BRITISH COMMERCIAL GAS ASSOCIATION ILLUSTRATED—Booklet, entitled "Light on the Roads," containing recommendations on the M.O.T. Committee's Street Lighting Report, illustrated by photographs of gas lighted streets.

G.V.D. ILLUMINATORS, LTD.—Illustrated Brochure explaining the nature and advantages of G.V.D. system of lighting. Illustrations of lighting installations for restaurants, shops, hospitals, flats, offices, etc.

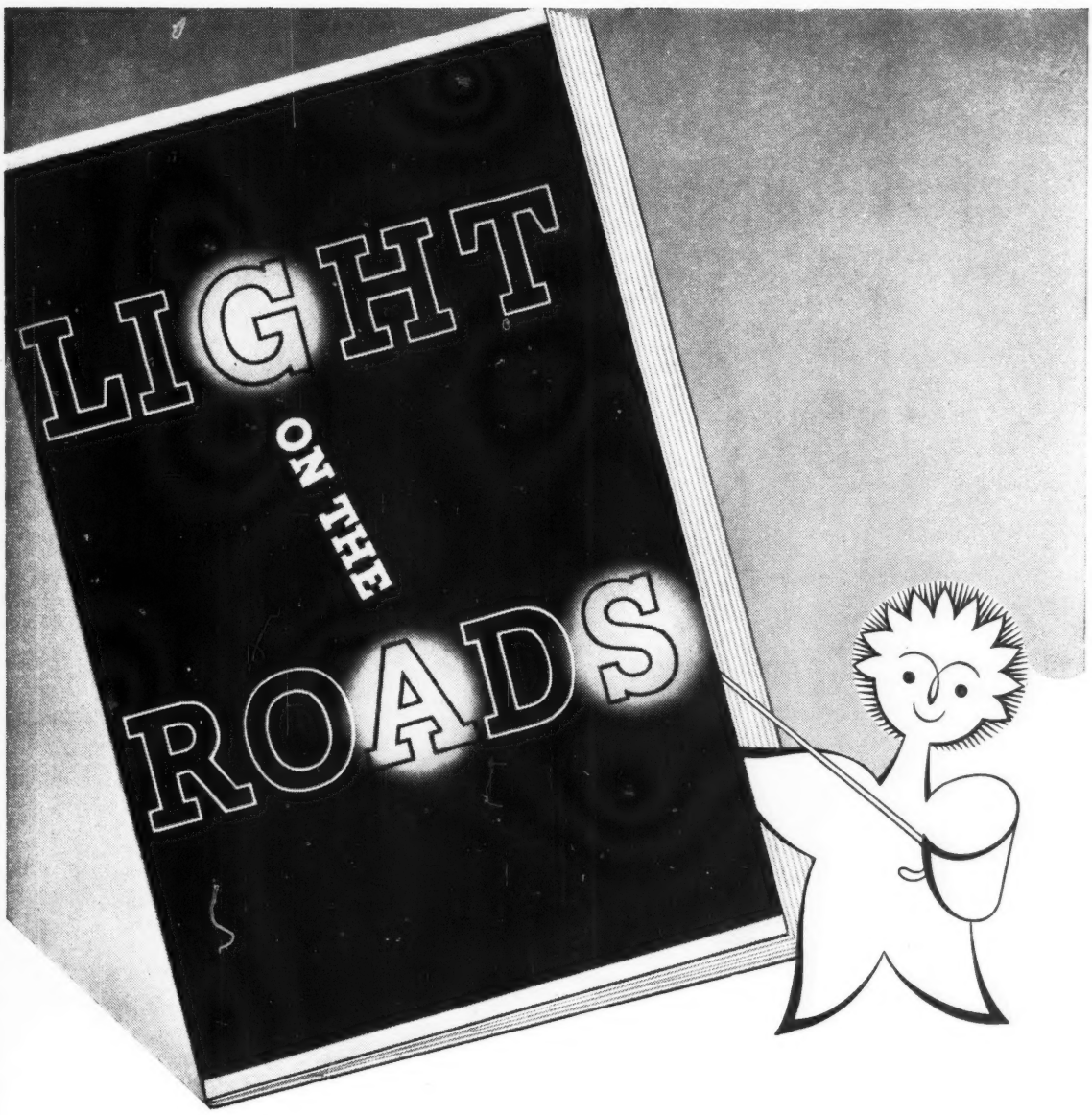
SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD.—New list (No. 955) Siemens' lightmeter and demonstration cabinet, etc.

Street Lighting Items

Wembley (G.E.C.) lanterns and 500-watt Osram lamps have been adopted for the lighting of some important thoroughfares in Ashton-under-Lyne.

Holophane (PBL) reflector lanterns with gas-filled lamps have been adopted for the new lighting of Merrion Road, Dublin (see p. 355).

Another contract has been placed by the Bournemouth Corporation for the lighting of a further 1¾ miles of roads with Siemens "Sieray" lamps and equipment.



The Departmental Committee has made and published its report. Now comes the difficult part of your work—putting the Committee's recommendations into practice without too great an expenditure of labour, time, and money.

Mr. Therm has also published a new report, called "Light on the Roads." It deals specifically with the Committee's report, and shows (giving plenty of evidence) how Gas Lighting solves the difficulties involved, both technical and financial. This booklet has been seen already by a number of lighting engineers, and has earned some generous praise. We should like to send you a copy, free. Whether the roads in your district are lighted by gas or not, we believe this booklet will be a considerable help to you—if only for its clear analysis of the problems to be faced.

Please write for a copy to:—

THE BRITISH COMMERCIAL GAS ASSOCIATION, GAS INDUSTRY HOUSE, 1, GROSVENOR PLACE, LONDON, S.W.1

Printed by the ARGUS PRESS, LTD., Temple-avenue and Tudor-street, London, E.C.4, England.